

IN THE CLAIMS:

On amended sheet 23, in line 1, please cancel "Claims" and substitute:

--WE CLAIM AS OUR INVENTION:-- therefor.

Cancel claims 1-16 on amended sheets 23-28.

5 1-16 (Cancelled)

17. (New) A method for analyzing neuronal activities in neuronal areas of a living subject, comprising the steps of:

10 obtaining a plurality of signals from a neuronal area of a living subject,
 each of said signals representing neuronal activity in said
 neuronal area;

 forming a matchable coupling of all of said signals in said plurality of
 signals using matchable coupling variables that describe a
 statistical relationship between signals in said plurality of signals
 that are matchably coupled;

15 determining respective probabilities for occurrence of said signals
 based on a higher order statistical distribution of the occurrence
 of said signals;

 determining said matchable coupling variables by optimizing said
 probabilities; and

20 analyzing said neuronal activity using said matchable coupling
 variables.

18. (New) A method as claimed in claim 17 comprising employing statistical distribution described by an Edgeworth expansion as said higher order statistical distribution.

25 19. (New) A method as claimed in claim 17 comprising employing a sum of normal distributions as said higher order statistical distribution.

20. (New) A method as claimed in claim 17 comprising optimizing said probabilities using a maximum likelihood estimation technique.

21. (New) A method as claimed in claim 17 comprising employing a relationship between said statistical relationship and said statistical distribution in optimizing said probabilities.

5 22. (New) A method as claimed in claim 17 wherein said signals in said plurality of signals are subject to external influences outside of said living subject, and employing said external influences to determine said statistical relationship.

10 23. (New) A method as claimed in claim 17 comprising determining said plurality of signals by a measurement conducted with respect to said living subject.

24. (New) A method as claimed in claim 23 comprising obtaining BOLD signals in said measurement as said plurality of signals.

15 25. (New) A method as claimed in claim 17 comprising obtaining said plurality of signals from an area of the brain of said living subject, as said neuronal area.

26. (New) A method as claimed in claim 17 comprising obtaining BOLD signals, as said plurality of signals, in a functional magnetic resonance imaging scan of said living subject.

20 27. (New) A method as claimed in claim 17 comprising analyzing said matchable coupling variable associated with said BOLD signals to diagnose a functional disorder of said area of the brain of the living subject.

28. (New) An arrangement for analyzing neuronal activities in neuronal areas of a living subject, comprising:

25 a signal acquisition device adapted to interact with a living subject to obtain a plurality of signals from a neuronal area of the living subject, each of said signals representing neuronal activity in said neuronal area; and

5 a computer supplied with said signals, said computer electronically
forming a matchable coupling of all of said signals in said
plurality of signals using matchable coupling variables that
describe a statistical relationship between signals in said
10 plurality of signals that are matchably coupled, and electronically
determining respective probabilities for occurrence of said
signals based on a higher order statistical distribution of the
occurrence of said signals, electronically determining said
matchable coupling variables by optimizing said probabilities,
15 and electronically analyzing said neuronal activity using said
matchable coupling variables.

29. (New) An arrangement as claimed in claim 28 wherein said
signal acquisition device is an fMRI scanner and wherein said plurality of
signals is a plurality of BOLD signals acquired by said fMRI scanner.

15 30. (New) A computer program product stored in a computer-
readable storage medium for analyzing neuronal activities in neuronal areas
of a living subject from a plurality of signals obtained from a neuronal area of
a living subject, each of said signals representing neuronal activity in said
neuronal area, said computer program product, when said storage medium is
20 loaded into a computer, causing said computer to:

electronically form a matchable coupling of all of said signals in said
plurality of signals using matchable coupling variables that
describe a statistical relationship between signals in said
plurality of signals that are matchably coupled;
25 electronically determine respective probabilities for occurrence of said
signals based on a higher order statistical distribution of the
occurrence of said signals;
electronically determine said matchable coupling variables by
optimizing said probabilities; and
30 electronically analyze said neuronal activity using said matchable
coupling variables.